no doubt, to the fact that these were exposed to the sunlight while the others were not.

Females reared from *futilis* galls this season are .10 in length; the wings .10 and the antennæ .07 with thirteen joints only, with a partial suture on one side of the terminal joint.

The median line on the thorax entirely wanting; the head less hairy but with a few scattered hairs on the thorax and on the sides of the second abdominal segment. The wing-veins are a darker brown.

The galls are blister-like swellings in the smooth bark of the roots of young white oak trees, completely covering the root in some cases for the distance of two feet or more from the tree.

NOTE.—A later examination of these insects in a strong light shows that the head and abdomen are really a very dark reddish brown. In ordinary reflected light they are easily taken for black.

ON A NEW SPECIES OF PEDIOPSIS.

BY EDWARD P. VAN DUZEE, BUFFALO, N. Y.

To the kindness of Mr. D. W. Coquillett of Los Angeles, California, I am indebted for the opportunity of examining a very interesting lot of *Jassidae* from that locality. Among this material is one insect that deserves special notice. It is a species of *Pediopsis* closely allied to the eastern *viridis*, and still more closely to the European *virescens*. The colors are probably somewhat faded and possibly altered by an alcoholic bath, but this will scarcely affect the determination of the species. It may be characterized as follows:

PEDIOPSIS OCCIDENTALIS n. sp.

Female.—Form of *P. viridis*, broader and more robust than *P. virescens*. Color dull greenish yellow, uniform; propleura with a black spot; antennal seta brown. Length about 5 mm.

Face as in *virescens*, more distinctly punctured than in *viridis;* front broader below at the base of the clypeus, which is proportionately narrower, and the lorae are much more tumid than in that species or *virescens;* the clypeus is broadly depressed entirely across the apex, while in *viridis* this depression is confined to the narrow submargin on either side before the lora, and is scarcely more extended than in the European species. Antennae pale at base, setae brownish. Pronotum shorter and broader than in either of the allied species; the rugae are less distinct than in *virescens*, but more so than in *viridis*. Propleura with a black spot. Ventral plate as in *virescens*, shorter and broader toward the apex than in *viridis*, the tip emarginate, and the sides distinctly con-

vex, not concave as in our eastern species. In other characters it does not seem to differ from its allies.

Male.—Very similar to *P. viridis;* dull grey- or greenish-brown; elytra subhyaline fulvous-brown; beneath paler; propleura with a black spot. Length about 4 mm.

Face rugosely punctured above, front with shallow punctures; lorae narrow, tumid. Apex of the clypeus narrowly depressed. Antennae pale brown, setae darker, claws brown. Abdomen tinged with rufous. This form hardly differs from the brown males of *viridis;* the pronotum is somewhat more rounded before, the general color is a more uniform greyish-brown, and there is no indication of the dark shade on the basal angles of the scutellum so generally found in the male *viridis*.

California. Described from two females and three males. Nos. 602 ♂ and 603 ♀. Coquillett.

The existence of this species on the Pacific coast suggests a very interesting line of conjecture to which I wish to draw attention here. In *Pediopsis* we find three species of a uniform green color and closely allied structurally but still separable by characters apparently constant, viz: *virescens* ranging over the whole of Europe and Great Britian; *viridis* occupying the whole of North America east of the Rocky Mountains and extending its range southward at least to the southern boundary of the United States; and *occidentalis* with an unknown range on the Pacific coast. The differences between these species have been indicated above. A careful review of these will show that the Californian species is very close to the European while our eastern form differs more widely from both; still in some characters *occidentalis* approaches much nearer to *viridis* than to *virescens*, such as the form and sculpturation of the pronotum, and the general proportions of the whole insect; the form of the clypeus and ventral plate agree very closely with *virescens* and seem to ally the insect most closely with that species. Thus far the females. Of the males I cannot speak as positively; the brown forms occurring with *viridis* and *occidentalis* I have assumed to be the males of these species. In the case of *viridis* I have all but positive proof, but in *occidentalis* analogy has been my only guide. If my assignment of the males is correct we have in *virescens* only green males (I can find no record of a brown form), in *viridis* both green and brown forms, the latter by far the more abundant in New York, and in *occidentalis* only brown males as far as known. The brown males of our American species are scarcely separable, but a few characters seem to be available for this purpose; possibly these brown males are melanic forms dependant on atmospheric conditions for their appearance.

A question naturally suggested by a comparison of these closely allied species is: Where did they originate and how are they related? For an explanation at all satisfactory we must go back to a time before the glacial epoch when doubtless the parent form occupied a

broad territory in the high northern latitudes extending its range more or less over the north of both hemispheres. With the southern advance of the polar ice-sheet this insect was driven far to the south where the oceans and meridional mountain ranges divided the original form into at least three distinct families, which, isolated from each other, and under the influence of different environments, have been modified and become fixed into the species as we now find them. It would but poorly satisfy the conditions of the case to suppose that either form, as at present distinguished, has, after being introduced into the other faunal regions, become modified to the extent we find here.

Therefore we doubtless have here three species of equal value and of the same age, although not equally differentiated from one another. The similarity of the climatic conditions surrounding the European and Californian families would naturally produce, as we find to be the case, species more closely related to each other than to the eastern American family, surrounded as it was by greater climatic variations and occupying probably a much larger area. This view of the origin of these little green pediopsids is in full accord with the views of Mr. A. R. Grote, in regard to the origin of the North American lepidopterous fauna, expressed in v. 1 of the *Bulletin of the Buffalo society of natural sciences*, p. 200 and more fully developed in 1884 in v. 18 of the *Canadian entomologist*.

Some portions of the North American homopterous fauna very closely parallel the corresponding European faunas but I apprehend that but few species—such as have been recently introduced, and possibly a few others—will prove to be actually identical with the European forms. These many allied species, suggesting so strongly a common origin, belong to distinctively northern groups that show as marked a parallelism in genera as in species, and seem to be decendants of a tertiary fauna common to the northern parts of both hemispheres, which in adjusting themselves to the conditions imposed on them by glacial action have been modified, some more, some less, but few so little that they can now be declared identical. A comparison of the European and American lists of *Jassidae* will show a very large percentage of northern European genera represented in boreal America. A few peculiar groups of course appear, but when our western hemiptera are better known this general statement will, I am convinced, find strong additional verification.

Of the species of hemiptera common to both sides of the Atlantic some appear to have undergone no change, such are *Cymus claviculus*, *Scolopostethus affinis*, *Leptopterna dolobrata*, *Opsiocoetus personatus*, *Cicadula 6-notatus* etc. Others while practically identical, exhibit modifications of structure or marking, or tend to produce varieties not strictly paralleled in the European facies of the species, e. g. *Hebrus pusillus*, *Philaenus spumarius*, *Athysanus striola*, and possibly *Lygus prat-*

ensis. Still others, while but little more widely differentiated are considered as distinct species; there are many of these but a few will answer for illustration, *Eurygaster alternatus* and *E. maurus*, *Neottiglossa undata* and *N. inflexa*, *Triphleps insidiosus* and *T. niger*, *Cixius pini* and *C. stigmaticus*, and *Deltocephalus debilis* and *D. abdominalis*. The first series may probably have been introduced from one faunal region to another, but the two latter series naturally lead us to look back to a common preglacial ancestor whose descendants in the second series have, in accomodating themselves to their changing environments, undergone a similar modification in the different regions, or have exhibited greater stability in resisting these changes. In the third series the change has been a little—sometimes only a very little—more perceptable.

In *Psyche* v. 5. p. 211-214, Mr. C. W. Woodworth, in an interesting and instructive paper on the genera of the North American typhlocybini, says he has not recognized a single European species of the group from this country; he seems to have been unaware of the fact that *Kybos smaragdulus* occurs not only throughout the northern states and Canada but even as far west as California from whence I have recently received examples from Mr. Coquillett.

SYNOPSIS OF THE ODONATA OF NORTH AMERICA. No. 1.

BY HERMANN AUGUST HAGEN, CAMBRIDGE, MASS.

Since 1861, when my Synopsis was published by the Smithsonian Institution, I have, of course, studied these Odonata. The specimens described in my first work were never less than three years old, mostly over twenty, some nearly sixty. During my residence here I have always tried to compare fresh specimens, and if possible to describe living ones. There are very few of which the old types could not be studied again with new specimens. Of the species described since 1861 I have seen the types or had sufficient information by the authors themselves. The localities are given here always as complete and detailed as possible.

Tribe I. Agrionina.

Eyes distant; antennae four-jointed; wings equal; abdomen cylindrical, slender; accessory male-genitals with the anterior hamulus connate; penis and vesicula separated; female genitals vaginate.

Sub-family. Calopterygina.

Antecubital veins numerous.

Calopteryx Leach.

Wings broad, densely reticulated; pterostigma absent in the male; in the female absent, or very small, or irregular, areolate; basal space without transverse veins; quadrangular space